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ABSTRACT

This paper presents a case for the development and support of a computer-based interactive multimedia program for teaching analysis in community college architecture design programs. Analysis in architecture design is an extremely important strategy for the teaching of higher-order thinking skills, which senior schools of architecture look for in potential transfers. Interactive multimedia learning accommodates self-paced, individual comprehension rates and allows for repetition of material, using the computer to combine text, graphics, audio, and video with links that let the user navigate and communicate. The paper cites various publications for strengths and weaknesses in a multimedia approach to analysis in architecture design. The Cognitive Learning Theory and Bloom's Taxonomy are also referenced to demonstrate the value of analysis as a higher-level thinking skill. An outline is presented listing the areas of expertise and support needed to produce multimedia lectures and related courseware. The paper concludes with a sample lecture schedule to show the integration of analysis and multimedia into a History of Modern Architecture course. (YKH)

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Using Multimedia for Teaching Analysis in History of Modern Architecture

Garry Perryman

In: Issues of Education at Community Colleges:
Essays by Fellows in the Mid-Career Fellowship Program at Princeton University

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Using Multimedia for Teaching Analysis
In History of Modern Architecture

Abstract: The purpose of this research is to present a case for the development and support of a computer based interactive multimedia program. This program is for the teaching of analysis in a History of Modern Architecture course. The importance of analysis in architecture design will be emphasized as an effective strategy for the teaching of higher-order thinking skills. This project is important in the Community College Architecture design program because these are the skills which senior schools of architecture look for in potential transfers. Recent publications will be cited for strengths and weaknesses that point to the need for a multimedia approach to analysis in architecture design and this particular course. Analysis will be defined and a Lecture Schedule for the fall 1998 will be presented to show how the use of this program will be integrated within the framework of the semester. The support required to properly develop an interactive multimedia program will also is outlined.

Content:

The importance of analysis in architecture design

Interactive Multimedia

Defining Analysis

Publications

Approaches to analysis

Pedagogy

Support

Analysis project

Lecture Schedule

Sources

History 520 - Princeton University
Garry Perryman Mercer County Community College

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Multimedia for Teaching Analysis in History of Modern Architecture

Analysis of existing buildings is a primary educational approach used in most architecture design programs to teach the basic vocabulary and grammar of design. As a pedagogical strategy analysis more than any other exercise teaches students not only the language of architecture but also higher level thinking skills such as problem solving and creativity. The recent publication of a number of texts dealing specifically with the analysis of architecture has added to the sources that instructors and students can turn for design analysis. While these publications define the elements or systems to be analyzed and some provide a methodology they are not explicit in either. That is while defining elements, and there is little agreement on what those are, they do not give an explicit methodology, usually just examples of the concepts or diagrams and they become quite confusing for the beginning design student.

Given that the educational system K through 12 does not provide an adequate preparation for students entering architecture design curriculums, the main goal of the beginning design curriculum is to bridge the gap between entry level skills and those required in the professional design curriculum. This task is more important in the Community College Architecture design programs because these are the skills which senior schools of architecture look for in potential transfers. These are the higher level thinking abilities in the cognitive domain, analysis, synthesis and evaluation.

The pedagogical importance of analysis in beginning design studios cannot be overstated. The proceedings of the annual National Conference on the Beginning Design Students, articles in the Journal of Architecture Education and many studies of architecture design studio teaching attest to this importance. (Perryman 1989) It is also important though that analysis be taught with very explicit goals in mind to facilitate learning. It is the objective of this proposal that these goals can be greatly enhanced by the development of an interactive Multimedia computer based program. Such an interactive Multimedia computer based program would not only assist the instructor in

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demonstrating the concepts of analysis but also provide access for students to images and self paced demonstrations of analysis.

Interactive Multi-media

Multimedia instruction is the use of the computer to present and combine text, graphics, audio and video, with links and tools that let the user navigate, interact, create and communicate. [The Impact of Information Technology on Instruction and Learning; Univ. of Texas at Austin]

We are being told that the use of multimedia, the computer, in the classroom has the potential to revolutionizing teaching and learning. The use of computers in teaching and learning has not proven significantly effective. So to create an interactive Multimedia computer based program without the promise of a more effective results would seem a waste of time. But using multimedia for presentations and as a source of images for students in the course History of Modern Architecture could have certain advantages. History of Modern Architecture requires the use of visual aides mainly in the form of 35mm slides. This assembling of slides for each lecture is itself a time consuming task. A number of CD-ROMs, computer based references, on architecture published in the last few years offer good sources for images and biographical knowledge of either a single architect or a compendium of architecture history.

With the simplified nature of many authoring programs assembling images for a lecture for multimedia is much the same as slides. The Multimedia computer integrates all of the existing media modes into one interactive presentation medium. The computer as the controlling factor distinguishes multimedia from those past modes such as overhead, slide, movie, and audio 'projectors'. These programs have the added benefit of allowing for the importation of movies and audio in the presentation. Multimedia programs can not only be used in the lecture and assist the instructor in demonstrating the concepts of analysis but also provide access for students to an image bank for further study.

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The capabilities of the computer for formal analysis in architecture are especially exciting. Computer animations can demonstrate concepts of analysis in an interactive way that allows the student to repeat the concepts until they fully understand them. Students can also see how the same concepts relate to historically significant designs. The advantages of computer based interactive learning is the accommodation of self paced individual learning rate and repetition.

Defining Analysis

Bermudez and Grebner, in Teaching Analytical Thinking & Representation in Beginning Design, state that:

> *Analysis offers the traditional learning experience for understanding design by decomposing and discovering relationships and parts of the analyzed whole. As designers always intend a new synthesis of the world (design), they must become acquainted with the analytical task of taking the world apart and putting it back together.*

Analysis is an important skill and:

> *We do have many working systems for the study and analysis of the components of visual messages.*
>
> *There is a visual syntax. There are guidelines for constructing compositions. There are basic elements that can be learned and understood by all students of the visual media, artist, and nonartists alike, and that, along with manipulative techniques, can be used to create clear visual messages. Knowledge of all these factors can lead to clearer comprehension of visual messages.*
>
> A Primer of Visual Literacy, Donis A. Dondis

There are a number of types of analysis in architecture and a more specific definition is needed for clarification. Site, context and program analysis are typically pre-design collections of information, data, which inform design decisions architecture students and architects make in the creation of designs and do not concern us here. We

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are more concerned with building type, precedent and formal analysis as types of analysis that seek understanding of existing buildings that can also inform design decisions, but more importantly seek underlying principles of design after the fact. Building type, precedent and formal analysis is the types of analysis that is important in the History of Modern Architecture course. Through precedent analysis students are encouraged to critically assess and assimilate the spatial concepts and formal ordering systems of a given historic building.

Architecture design education is based on teaching that models behaviors of architects in practice. Analysis is an important skill required of architects. Teaching formal precedent analysis is best assigned in history of architecture courses. The history course provides the broader context, from which the prototype, building was drawn form. Throughout the history of modern architecture design, practitioners and theorist in the creation of architecture have applied analysis to models that illustrate the spatial concepts and formal ordering systems of the architecture designs.

Analysis is very important in modern architecture and the concept of modernism. Modernism rose out of the rise of scientific inquiry. In architecture this occurred in late 17th century France in the work of the physician architect Claude Perrault#. Perrault, given the task of updating the ancient authority on architecture, Vitruvius#, began what many historians believe as the theoretical beginnings of modern architecture. It is Perrault's [dissection] , analysis of architecture that expressed a new modern objective method of looking at architecture. Dissection attempts to understand the systems that underlie the nature of an animal or in this case [analysis] to understand the basic ordering system of a building. The need for Analysis of architecture has a long history of importance in Architecture education.

Publications

The recent publication of a number of texts dealing specifically with the analysis of architecture has helped add to existing sources that instructors and students can turn for definition and methodologies for design analysis. Architecture, form space and order, by Francis Ching, is one of the most widely used texts in beginning design courses. Ching

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defines many concepts and elements of architecture along with many examples. He does not provide a methodology for analysis though. Precedents in Architecture: by Clark and Pause also define the elements of architecture and provide full-page layouts of diagrams. They even provide a large number of extended concepts and diagrams across time but do not provide a methodology for analysis either. In Design Strategies in Architecture, G. Baker has defined elements or systems and a methodology , but this methodology becomes quite complicated. Architecture, form space and order, is presently used in a basic design course at MCCC for reference. Precedents in Architecture has been used as a reference for the History of Architecture course in the past but only seem to confuse students.

More recent books Analyzing Architecture, by Simon Unwin; and Design Analysis by Leupen, Grafe, Kornig, Lampe and De zeeww, are clearer in their definition of concepts for analysis but only Design Analysis sets up a method. This method is well worked out and would make a good text for the History of Architecture course.
It is because of the complexity of some of these methodologies that I believe there is a need for interactive computer based animation's to help with learning and understanding of analysis.

There are a number of computer based references on architecture published in the last few years. Most of these are very good sources for images and biographical knowledge of either a single architect or compendium of architecture history. None of these contain references to analysis although a CD-ROM based on the work of Louis I. Kahn, (Wiggins) does contain an animation, which explains the layering of Kahn's design of the Library of Phillips Exeter Academy. This Animation helps to clarify the conceptual basis of the design better than the diagrams of the same design in Precedents in Architecture by Clark and Pause. The CD-ROM also contains video and a contextual analysis, of the surrounding campus. It is this animation which more than any thing else expresses the way important but difficult concepts in analysis can better clarified.

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Approaches to analysis

There are two instructional strategies used in approaching analysis, the first that of discovery. Where the student is provided with only a statement of the problem, usually rather vague as to allow for different interpretations. The second strategy is a structured strategy that gives the student a list of principles to explore, a methodology of analysis, procedure and how the results are to be represented, drawings diagrams. The second strategy is in history course on Modern architecture.

Pedagogy

Bermudez and Grebner in Teaching Analytical Thinking & Representation in Beginning Design addressed the pedagogical importance of analysis in beginning design studios. They address Cognitive Learning Theory and the use of analysis projects in architecture design. They demonstrate that as a pedagogical strategy analysis teaches higher level thinking skills such as problem solving and creativity. They state that:

> *Design in architecture is the process of solving problems and creating, that which did not exist before. Design education differs from traditional education that teaches the acquisition of knowledge and then its employment. In design acquisition of knowledge is purposeful, practical and meaningful in that it is needed to solve a design problem. That is, the acquisition of knowledge results from the need to know not from manipulation or study of given or taught knowledge. The practice of design tends toward developing the type of knowledge necessary to acquire or use knowledge or the development of contextual knowledge.*

These are the higher level thinking abilities in the cognitive domain of analysis, synthesis and evaluation.

Bloom's Taxonomy also gives us evidence of the pedagogical significance of analysis as a higher level thinking skill. Bloom's Taxonomy for cognitive and affective domains, is an important part of a methodology of classifying of instructional objectives in the cognitive domain. The N.A.A.B.# refers to Bloom's Taxonomy in constructing their criteria for the evaluation of architectural schools for accreditation. Within these

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Taxonomies there are three domains of learning Cognitive, Affective and Psychomotor. Here the concern is with the cognitive domain as it pertains to analysis and architectural education. There are six levels of Bloom's Taxonomy with-in the cognitive domain which are hierarchical from simple, recall of information to more complex mental functions. These levels are knowledge, comprehension, application, analysis, synthesis, and evaluation. The other domains of Bloom's Taxonomy are also important in architecture education but are not considered here. Ching and others define the design process as a cyclical process of analysis, synthesis and evaluation, which are all higher levels of thinking.

Support for the production of multimedia

The amount of preparation that goes into a lecture, content, producing overheads, or creating slides, even to ordering other media support from centralized media is time consuming. To produce a multimedia presentation takes even more time and expertise. The following is an outline of areas of expertise and support that is required to produce multimedia lectures and related courseware, such as CD-ROM or server based content.
Outline for Creating Multimedia for the Study & Analysis of Modern Architecture?

O Objectives
- Develop CD-ROM or Server based content to augment instruction in History and Theory of Modern Architecture Course to aid in learning.
- Establish an image bank reference.
- Establish examples and images plans etc. for analysis of significant works
  Of architecture.
- Create animations to illustrate concepts of architectural analysis.

Creating a Multimedia Title

O Planning and designing your title
- What do you name it?

O developing the media effects
- What and how should the student interact with it?

O authoring the final title
- What is the Concept?

O Prototype the title
- See how students react to the title concept

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Multimedia Production and Development

- O Design
- O Strategies
- O Authoring package
- O Multimedia materials
- O Equipment
- O Support

Design

- O titles that require specific audience responses
- O navigational jumps
- O questions to answer
- O other on screen elements

Strategies
Write a Specification
Plan the project
Think through every aspect

- O a complete specification explains
  - The audience.
- O Architecture students
  - And purpose for title
- O to express the past as a place students are connected with

Content:
History and Theory of Modern Architecture

- O Students read article-from Architectural Forum 1965 about LeCorbusier's death
- O Students can find more information via CD-ROM and Server as well as www.corbuarchive.com

Students select a Building for Analysis or develop plan in AutoCad

Students analyze plan in AutoCad

- o Students seek the fundamental elements, which the architect used in forming the building
- o the analysis poses many questions for the student as to the underlying formal aspects of architecture

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Authoring software and Multimedia materials

- Macromedia Director
- AutoCad

Equipment:
development

- pentium 233mhz
- 64MB RAM
- 3 GB Hard Drive
- 16 BIT Sound card
- Video graphics adapter card
- Zip drive
- CD-ROM R W

Equipment:
student access

- Architecture Studio Lab w 20 computers
- Pentium 100 Mhz
- 32 MB RAM
- 3 GB Hard Drive
- CD-ROM DRIVE
- Digitizer and mouse
- Autocad R-14 software

The following lecture schedule is created to show the integration of analysis augmented with multi-media into the History of Modern Architecture course. The approach here is to focus on a particular element as that element orders the architecture of a specific time. A new element is studied as the development of architecture progresses until a mid-point in the semester where all the elements up to that point are applied to one of the seminal works of modern architecture, the Villa Savoye.

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HISTORY of MODERN ARCHITECTURE AR-124 LECTURE SCHEDULE

WEEK

Required reading from Text Recommended Readings

1 Course Objectives Introduction Modern Classicism vs. The Project of the Modern

Analyzing Architecture Robert Stern pp. Aaron Betsky pp.

Neo-Classical arch Territorial and Technological transformations

Analysis: Paris and The Paris Opera [Program functional and symbolic aspects.]

2 William Morris & the Arts & Crafts Maybeck Morgan Greene & Greene

3 The Chicago School Richardson and Sullivan

Analysis: The Guaranty Building, Buffalo, NY. Structure The load carrying elements and their relationship to the definition of function.

4 The Worlds Fair Mekim,Mead & White The Ecole des beaux arts methodology of design Garnier & Perret

Analysis: Parti

5 Early F.L. Wright

Analysis: Exploding the Box Axis The implied line(s) of composition.

Art Nouveau Horta Gaudi Mackintosh & the Vienna Secession Loos & Van de Velde

Analysis: Horta Circulation: The path of movement through the building.

6 The Werkbund The Futurist, The Bauhaus and Walter Gropius

Analysis: The Bauhaus hierarchy: formal and programmatic

7 Mies van der Rohe De Stijl & Rietveld

Analysis: The Barcalona Pavilion

Structure: and the definition of the space.

8 Le Corbusier

Analysis: Villa Savoye The plan analysis, how the formal and programmatic hierarchy informs each compositional element you analyze.

11

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9 International Style - The International Style Exhibit 1932

Analysis: Definition of an architecture, volume, asymmetry and ornamentation

10 Alvar Aalto - Italian Rationalism: Terragni

Analysis: Transformation

11 Louis Kahn - Johnson Per Saarinen

Analysis: Monumentality

12 Brutalism & Team 10

Analysis:

13 "The whites vs. the greys"

Analysis:

14 "Postmodernism"

Analysis:

15 "Deconstructivism"

Analysis:

C. Example: Villa Savoye, Le Corbusier

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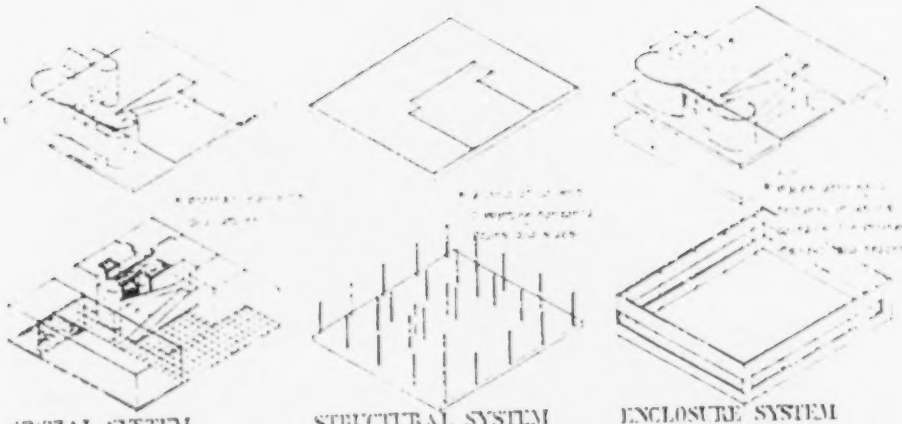
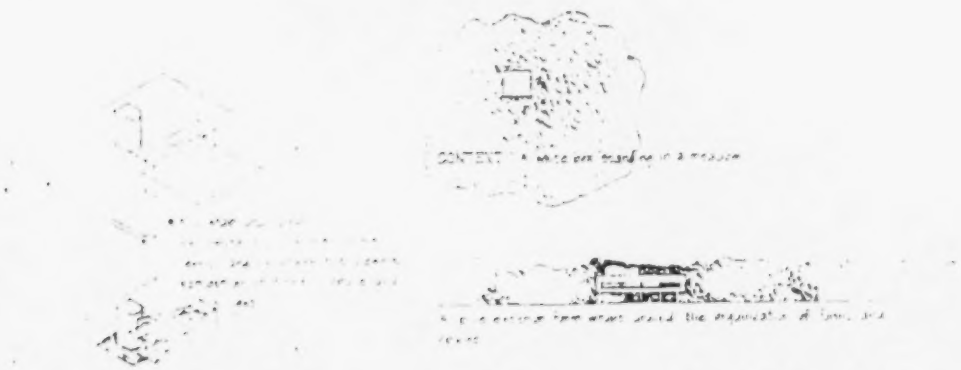
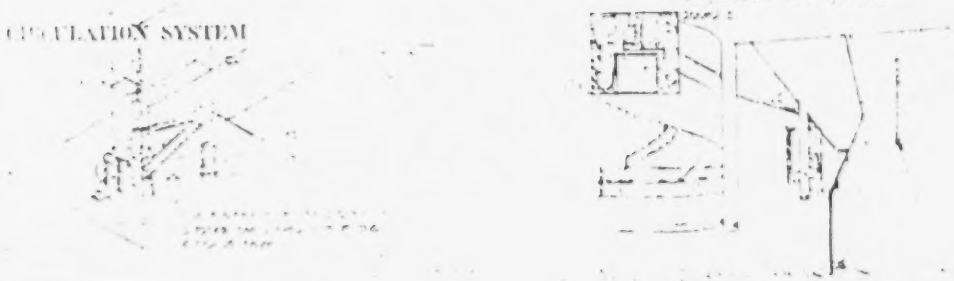


VILLA SAVOYE • POISSY, 1928-31 • LE CORBUSIER





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Masters Thesis: New Jersey Institute of Technology. 1989

Colin Rowe:

Simon Unwin: Analyzing Architecture: Routedge. 1997

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Varon D. Indication in Architectural Design: The William T. Comstock Company: 1916

G. Cullen' Visual Language of the City. Grebner & Bermudez

Books on reserve in the library:

CD-ROM

Wiggins Glenn E. : Louis I Kahn. The Library at Phillips Exeter Academy:

Van Nostrand Reinhold 1997

The Frank Lloyd Wright Companion: Prarie Multimedia. Inc. 1995.

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124ANL

AR124 HISTORY AND THEORY OF MODERN ARCHITECTURE

The intention of this project is to provide you the opportunity to analyse a work of architecture. Beginning with drawings, you are asked to suggest in drawings and text the ways and to what end the architect has manipulated elements and employed strategies to express a particular intent or idea about the building.

ASPECTS TO BE ANALYZED

A. Plan

The plan analysis should address the major floor of the work in question. Be aware of how you can best taylor your analysis to the specific project at hand. Also note the way in which a formal and programmatic hierarchy informs each compositional element you analyze.

1. Program The methods and techniques used for the expression of the program at functional and symbolic levels.

2. Geometry and proportion The sources of a geometric order, and the geometrical relationship between the parts, interior as well as exterior.

3. Axis The implied line(s) of composition. Be sure to distinguish between a circulation route and the primary compositional axes of the building. Note too that there may be secondary, more localized axes. How do the axes of the building coincide with axes of the site or context?

4. Circulation The path of movement through the building. Your drawing should illustrate the relationship between the path and the architectural order of the building.

5. Structure The load carrying (or apparently load carrying) elements and their relationship to the definition of the space.

6. Parti An abstracted diagram of primary organizational relationships. The parti may be gestural in nature, reflecting internal relationships and/or relationships of building to site.

B. Section

In one or more drawings, illustrate the sectional characteristics of the building while exploring the relationship between the parts in terms of proportion, scale, geometry, hierarchy, etc.

C. Elevation

Using the front elevation of the building, you should prepare separate diagrammatic drawings for each element of the organization. Think about how elevation and plan are related as you investigate different aspects.

1. Geometry / proportion An analysis of the geometrical order of the elevation

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2. Symmetry / balance: A description of the location and effect of the axis of symmetry or of the point of equilibrium.

3. Scale: How has the human figure been used as a determinant or generator of scale in the elevation?

4. Rhythm: Isolate and illustrate the rhythm of the components of the elevation.

5. Texture / Surface / Materiality: Describe the way in which the elevation is composed through the combination juxtaposition of different texture or materials.

D. Structure

Prepare an plan which illustrates the principle load carrying members of the building.

E. Relationship to context

Describe the relationship of the building to its surroundings, inside and outside.

F. Intentions

Remember that the best analysis can be the most speculative and may address aspects that are not suggested here, but that you discover on your own. What are the rules that guide the design of the building? Are these rules ever broken to accommodate or express a special condition?

G. A Short Biography of the Architect.

PRESENTATION REQUIREMENTS: Text (hand lettered and analytical drawings on. 8 1/2" x 11" format, including title with your name, course name and date.

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